



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,699	06/23/2003	Yung Hsien Wu	07942.0026-00000	5738

7590 08/03/2004

Finnegan, Henderson, Farabow,  
Garrett & Dunner, L.L.P.  
1300 I Street, N.W.  
Washington, DC 20005-3315

EXAMINER
----------

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
----------	--------------

1763

DATE MAILED: 08/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

11/1

<b>Office Action Summary</b>	Application No. 10/600,699	Applicant(s) WU, YUNG HSIEN	
	Examiner George A. Goudreau	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5 and 8 is/are rejected.
- 7) ☒ Claim(s) 3 and 6-7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

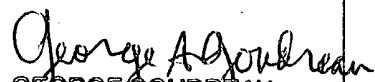
**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**GEORGE GOUDREAU**  
**PRIMARY EXAMINER**

**Attachment(s)**

- |  |   |
|--|---|
| <p>1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</p> <p>2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</p> <p>3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br/>             Paper No(s)/Mail Date _____</p> | <p>4) <input type="checkbox"/> Interview Summary (PTO-413)<br/>             Paper No(s)/Mail Date. _____</p> <p>5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</p> <p>6) <input type="checkbox"/> Other: _____</p> |
|--|---|

7-041

Art Unit: 1763

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Onishi et. al. (JP 04-037,132).

Onishi et. al. disclose a process for fabricating a FOX structure (5) on a wafer (1) which is comprised of the following steps:

- A first Si<sub>3</sub>N<sub>4</sub> layer (2) is formed onto the surface of the Si wafer (1).;
- The first Si<sub>3</sub>N<sub>4</sub> layer is patterned using a patterned photo resist etch mask.;
- A first SiO<sub>2</sub> layer (3) is conformably formed onto the surface of the first Si<sub>3</sub>N<sub>4</sub> layer.;
- A second Si<sub>3</sub>N<sub>4</sub> layer (4) is conformably formed onto the surface of the first SiO<sub>2</sub> layer (3).

This is shown in figures 1-3. This is discussed specifically in the abstract; and discussed in general on pages 171-174.

3. Claims 1, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (KR-2000020897).

Lee disclose a process for forming a FOX (20) on the surface of a Si wafer (11) which is comprised of the following steps:

- A first SiO<sub>2</sub> layer (13) is formed onto the surface of the Si wafer (11).;
- A first Si<sub>3</sub>N<sub>4</sub> layer (15) is formed onto the surface of the first SiO<sub>2</sub> layer.;

- The first Si<sub>3</sub>N<sub>4</sub> layer is patterned using a patterned photo resist etch mask.; and
- A Second Si<sub>3</sub>N<sub>4</sub> layer (19) is conformably formed onto the surface of the first Si<sub>3</sub>N<sub>4</sub> layer (15) as well as onto the exposed surface of the first SiO<sub>2</sub> layer (13).

This is shown in figures 1-2. This is discussed specifically in the abstract; and discussed in general on pages 4-1 to 4-3.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2, and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied in either paragraphs 2 or 3 above.

The references as applied in either paragraphs 2 or 3 above fail to disclose the following aspects of applicant's claimed invention:

- the usage of a thermally enhanced CVD process to form the first Si<sub>3</sub>N<sub>4</sub> layer;

Art Unit: 1763

- the specific CVD process parameters which are claimed by the applicant for growing the first Si<sub>3</sub>N<sub>4</sub> layer; and
- the formation of the first Si<sub>3</sub>N<sub>4</sub> layer to the specific thickness which is claimed by the applicant

It would have been obvious to one skilled in the art to form the first Si<sub>3</sub>N<sub>4</sub> layer in any of the processes taught above to the specific thicknesses, which are claimed by the applicant based upon the following. It would have been desirable to form the first Si<sub>3</sub>N<sub>4</sub> layer to a sufficient thickness to facilitate its usage in the formation of the FOX structure on the wafer without forming the layer to an excessive thickness, which would waste precious process time, and money.

It would have been obvious to one skilled in the art to use a thermally enhanced CVD process to form the first Si<sub>3</sub>N<sub>4</sub> layer in any of the processes taught above based upon the following. It is conventional or at least well known in the semiconductor processing arts to form a Si<sub>3</sub>N<sub>4</sub> layer on a wafer using a thermally enhanced CVD process. (The examiner takes official notice in this regard.) Further, this would have simply involved the usage of an alternative, and at least equivalent means for forming the first Si<sub>3</sub>N<sub>4</sub> layer in these processes to the specific means, which are taught above.

It would have been prima facie obvious to employ any of a variety of different CVD process parameters in any of the thermal CVD processes which are used to form the first Si<sub>3</sub>N<sub>4</sub> layer in any of the processes which are taught above. These are all well known variables in the thermal CVD art, which are known to affect both the rate and the quality of the thermal CVD process. Further, the selection of particular values for these

variables would not necessitate any undo experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific CVD process parameters which are claimed by the applicant in any of the thermal CVD processes which are employed above to deposit the first Si<sub>3</sub>N<sub>4</sub> layer based upon *In re Aller* as cited below.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

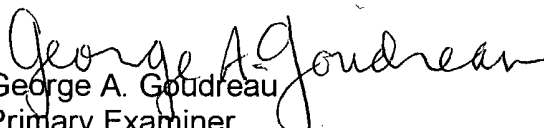
Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the thermal CVD process.

7. Claims 3, and 6-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication should be directed to examiner

George A. Goudreau at telephone number (571)-272-1434.

  
George A. Goudreau  
Primary Examiner  
Art Unit 1763